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**FEDERAL-STATE-PRIVATE
COOPERATIVE SNOW SURVEYS**



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***WATER SUPPLY OUTLOOK
FOR
WESTERN UNITED STATES***

Including Columbia River Drainage in Canada

Prepared by

U. S. DEPARTMENT of AGRICULTURE ★ SOIL CONSERVATION SERVICE

Collaborating with

CALIFORNIA DEPARTMENT of WATER RESOURCES

and

**BRITISH COLUMBIA DEPARTMENT of
LANDS, FORESTS and WATER RESOURCES**

AS OF
FEB. 1, 1972

TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1900 snow courses in Western United States and in the Columbia Basin in British Columbia. Networks of automatic snow water equivalent and related data sensing devices, along with radio telemetry are expanding and will provide a continuous record of snow water and other parameters of key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

COVER PHOTO NUMBER ORC 221-3

PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, Western Regional Technical Service Center, Room 209, 701 N. W. Glisan, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	P. O. Box "F", Palmer, Alaska 99645
Arizona	6029 Federal Building, Phoenix, Arizona 85025
Colorado (N. Mex.)	P. O. Box 17107, Denver, Colorado 80217
Idaho	Room 345, 304 N. 8th. St., Boise, Idaho 83702
Montana	P. O. Box 970, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno Nevada 89505
Oregon	1218 S. W. Washington St., Portland, Oregon 97205
Utah	4012 Federal Bldg., 125 South State St., Salt Lake City, Utah 84111
Washington	360 U.S. Court House, Spokane, Washington 99201
Wyoming	P. O. Box 2440, Casper, Wyoming 82601

PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Water Supply Forecast and Snow Surveys Unit, California Department of Water Resources, P. O. Box 388, Sacramento, California 95802 --- and for British Columbia by the Department of Lands, Forests and Water Resources, Water Resources Service, Parliament Building, Victoria, British Columbia



WATER SUPPLY OUTLOOK FOR WESTERN UNITED STATES

Including Columbia River Drainage in Canada

ISSUED

FEBRUARY 1, 1972

The Soil Conservation Service coordinates snow surveys conducted by its staff and many cooperators, including the Bureau of Reclamation, Corps of Engineers, Forest Service, National Park Service, NOAA, National Weather Service, Geological Survey, and other Federal Agencies, Departments of State Government, Irrigation Districts, Power Companies, and others.

The Department of Water Resources coordinates snow surveys in California.

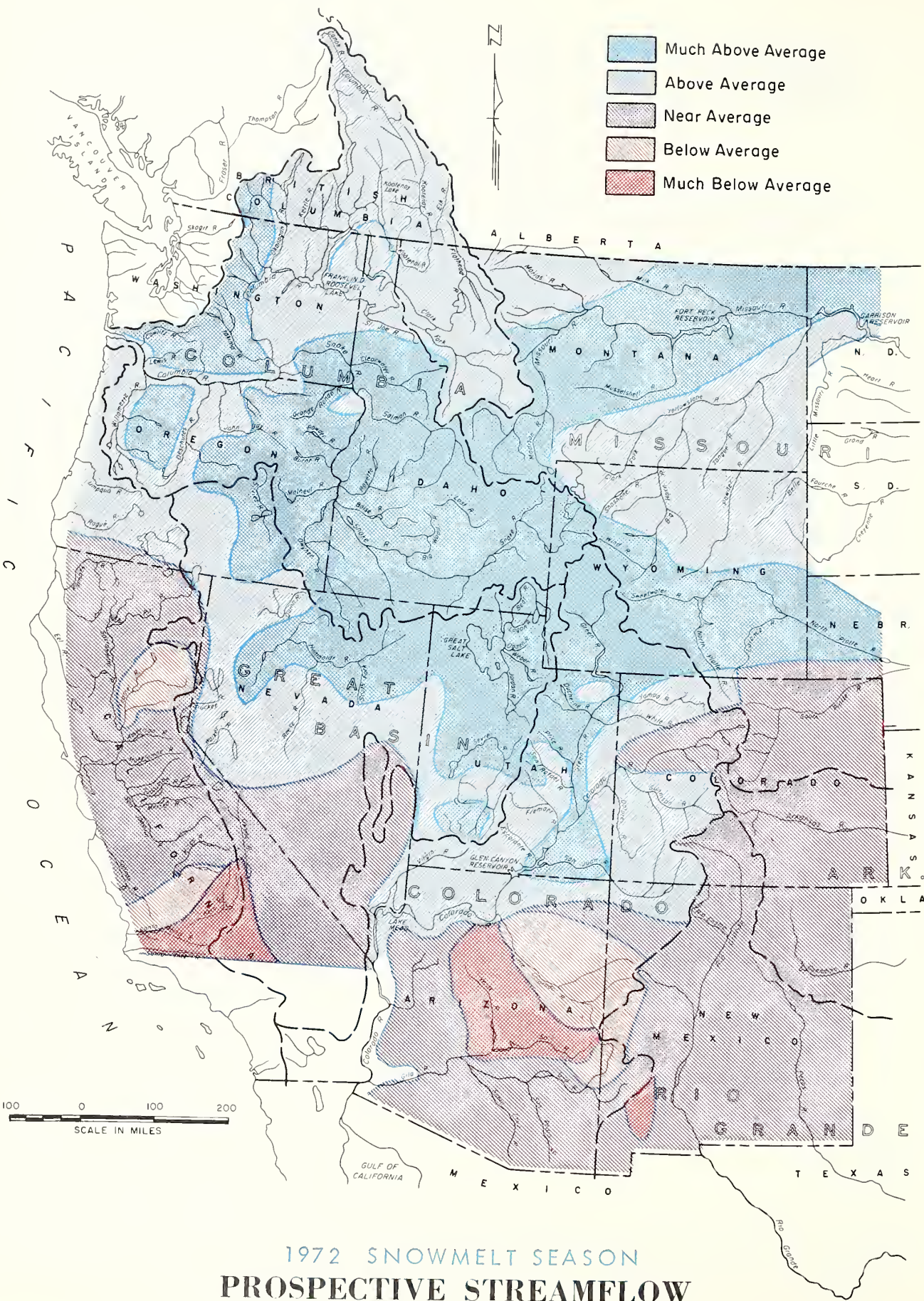
The Water Resources Service, Department of Lands, Forests, and Water Resources directs snow surveys in British Columbia.

This report was prepared by the Water Supply Forecasting Unit, Engineering Division, Soil Conservation Service, from data supplied by Snow Survey Supervisors of the Soil Conservation Service in the States of Alaska, Arizona, Colorado and New Mexico, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming.

Data from California was supplied by the Chief, Water Supply Forecast and Snow Survey Unit, Department of Water Resources.

Data from British Columbia was supplied by the Chief, Hydrology Division, Water Investigations Branch, Department of Lands, Forests and Water Resources.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
KENNETH E. GRANT, ADMINISTRATOR



1972 SNOWMELT SEASON
PROSPECTIVE STREAMFLOW
AS OF FEBRUARY 1, 1972

WATER SUPPLY OUTLOOK

1972 SNOWMELT SEASON
FEBRUARY 1, 1972

WESTERN SNOWPACKS RANGE FROM NEAR AVERAGE TO RECORD HIGHS ON MOST WATERSHEDS. COMBINED WITH GENERALLY EXCELLENT RESERVOIR STORAGE WATER, THIS PROVIDES A GOOD TO EXCELLENT WATER SUPPLY OUTLOOK FOR MOST IRRIGATED AREAS. HIGH WATER POTENTIAL EXISTS ON MANY STREAMS OF THE COLUMBIA, MISSOURI, GREEN AND GREAT BASIN. A DRY SPRING COULD CREATE MINOR SHORTAGES IN ARIZONA, NEW MEXICO AND SOUTHERN CALIFORNIA.

Rapid early season buildup of the mountain snowpack has caused it to already exceed average amounts for April 1 on many watersheds in Oregon, Washington, Idaho, Montana, Wyoming, Utah and northeastern Nevada. In many places the snow exceeds previous record high readings for February 1.

In the heavy snow areas the snow at the higher elevations is similar to last year's pack on this date, but the lower elevation snows are much heavier. Although some lower elevation watersheds - particularly in western Washington, Oregon and southern Idaho - lost snowpack during the warm period in January, there is still a major potential for high, fast runoff from many of these watersheds. There are also several high valley areas in Montana where early season flooding could occur if snows are melted too rapidly by warm rains or high temperatures.

Unless remaining winter and spring months are drier than normal, high water problems can also be expected when the main mountain snowpack melts during spring and early summer months.

The California Department of Water Resources reports that despite below normal precipitation, the snowpack in most Cascade and Sierra watersheds is about normal for this date. Storage in the State's major reservoirs is also about normal. Forecasts for the snowmelt period, based upon normal precipitation to follow, indicate that runoff from the State's streams will range from slightly above normal to 50 percent of normal. Carryover storage in the State's major reservoirs is normal or above in all major hydrographic areas except for the San Francisco Bay, Central Coastal, and the San Joaquin Valley. Here, water in storage is 90 percent of normal or more for this date. The present combination of water supply factors indicate that present water supply prospects should be adequate to meet most demands.

While the snowpack is heavy in the major

water producing areas of the United States portion of the Columbia Basin, it falls off to about 25 to 40 percent above average on the upper Columbia River in British Columbia, as reported by the British Columbia Water Resources Service, Department of Lands, Forests and Water Resources. The agency also reports that snow on the Kootenay, Okanogan and Similkameen rivers is high, ranging between about 145 to 180 percent of average. In general, snow on the Canadian watersheds is about 20 to 35 percent higher than last year at this time.

Montana's snowpack varies from about 120 percent on the Gallatin River to over 175 percent on the main stem tributaries of the Missouri River. Moving south into Wyoming the snowpack continues above average, ranging from 135 percent on the upper Yellowstone and Shoshone rivers to 175 percent on the Wind River. It is about 150 percent in the Big Horn Mountains and 160 percent on the Green River.

In Colorado, the snowpack on streams east of the Continental Divide drops off to about 10 to 20 percent above average on the South Platte and Arkansas rivers. Farther south snow on the Rio Grande River is about 25 percent above average, and essentially average on the Pecos and Canadian rivers.

In the Upper Colorado River Basin snow cover is excellent (near 115 to 160 percent). With inflow to Lake Powell for the April-July period forecast at 132 percent, prospects for water and power interests in the Lower Basin are also good.

Storage in Arizona's principal reservoirs is near normal or above and is sufficient to assure a good water supply for the major irrigated areas even though runoff will be somewhat below average.

The Great Basin has snowpacks which are average to near record highs in some places. Combined with reservoir storage which is near

SUMMARY OF SNOW WATER EQUIVALENT MEASUREMENTS

FEBRUARY 1, 1972

MAJOR BASIN AND SUB - WATERSHED	WATER EQUIVALENT IN PERCENT OF:		MAJOR BASIN AND SUB - WATERSHED	WATER EQUIVALENT IN PERCENT OF:	
	LAST YEAR	AVERAGE		LAST YEAR	AVERAGE
MISSOURI BASIN			SNAKE BASIN		
Jefferson	104	155	Snake above Jackson, Wyo.	92	151
Madison	91	140	Snake above Hiese, Idaho	94	157
Gallatin	83	121	Snake abv. American Falls Res.	95	157
Missouri Main Stem	151	178	Henry's Fork	90	140
Yellowstone	94	136	Southern Idaho Tributaries	150	240
Shoshone	87	137	Big and Little Wood	75	130
Wind	96	175	Boise	100	180
North Platte	77	130	Owyhee	205	205
South Platte	89	111	Payette	95	155
			Malheur	105	165
ARKANSAS BASIN			Weiser	80	155
Arkansas	111	115	Burnt	120	180
Cucharas-Purgatoire	163	121	Powder	105	175
			Salmon	95	145
RIO GRANDE BASIN			Grande Ronde	130	170
Rio Grande (Colo.)	156	125	Clearwater	120	170
Rio Grande abv. Otowi Bridge	153	123			
Pecos	270	104	LOWER COLUMBIA BASIN		
			Yakima	121	188
COLORADO BASIN			Umatilla	205	225
Green (Wyo.)	97	159	John Day	135	190
Yampa - White	86	113	Deschutes - Crooked	130	175
Duchesne	122	172	Hood	140	225
Price	114	157	Willamette	140	240
Upper Colorado	90	121	Lewis	109	194
Gunnison	109	122	Cowlitz	111	187
San Juan	136	128			
Dolores	110	125	PACIFIC COASTAL BASIN		
Virgin	121	155	Puget Sound	121	178
Gila	607	75	Olympic Peninsula	105	147
Salt	205	67	Umpqua - Rogue	135	170
			Klamath	140	155
			Trinity	80	125
GREAT BASIN					
Bear	93	169	CALIFORNIA		
Logan	88	159	CENTRAL VALLEY		
Ogden	105	180	Upper Sacramento	85	140
Weber	106	167	Feather	65	110
Provo - Utah Lake	114	150	Yuba	80	110
Jordan	112	165	American	75	120
Sevier	114	152	Mokelumne	75	115
Walker - Carson	103	135	Stanislaus	75	115
Tahoe - Truckee	76	122	Tuolumne	90	115
Humboldt	205	150	Merced	90	115
Lake Co. (Oregon)	160	125	San Joaquin	80	110
Harney Basin (Oregon)	170	175	Kings	90	110
			Kaweah	75	100
UPPER COLUMBIA BASIN			Tule	85	80
Columbia (Canada)	119	128	Kern	75	70
Koetenai	134	144			
Clark Fork	128	166	Data for California Watersheds supplied by Dept. of Water Resources, and for British Columbia Watersheds by Dept. of Lands, Forests and Water Resources.		
Bitterroot	95	141			
Flathead	120	164	Average is for 1953-67 period. California averages are for the period 1931-70. Based on Selected Snow Courses determined by Dis- tribution within the Basin, Length of Record and Repetitive Monthly Measurement Schedules.		
Spokane	115	165			
Okanogan	118	152			
Methow	107	164			
Chelan	110	151			
Wenatchee	108	177			

150 percent average in Utah and Nevada, this promises good to excellent water supplies next summer for all areas.

Alaska also has record or near record snow on watersheds of the Copper, Susitna, Chena and Salcha river basins.

Storage in principal irrigation reservoirs is near or above average in all states of the west except Montana and New Mexico. Storage will be no problem in Montana, but above normal storms are needed to offset the low storage and assure an adequate water supply.

MISSOURI BASIN

Snowfall on the upper Missouri River and its tributaries in Montana has been well above average during the first part of the snow accumulation season. It has been particularly heavy along the main stem tributaries where the present pack is near 75 to 80 percent above average. In several areas the snow water is near previous maximums for February 1, and equals or exceeds averages for April 1. Elsewhere in Montana the present snowpack ranges from about 120 percent on the Gallatin River to 155 percent on the Jefferson River.

Moving south into Wyoming the snowpack continues above average. It is about 135 percent on the upper Yellowstone River and Shoshone rivers. It increases to near 150 percent in the Big Horn Mountains and 175 percent on the Wind River.

Snow cover on the North Platte River is 130 percent, but drops off to near 10 percent above average on Colorado's South Platte River.

Moisture in soils underlying the snowpack is near normal in Colorado and Wyoming. It is above normal on Montana's Beaverhead, Madison and upper Gallatin drainages, generally near normal elsewhere with the exception of lower portions of the Milk, Marias, Judith and Musselshell drainages. These areas have below normal soil moisture.

Anticipated flow of streams in Montana and Wyoming range from about 115 percent to 200 percent, with the highest flow expected from Montana's Beaverhead River. Most Montana streams should yield near 135 to 150 percent of average amounts, while the majority of Wyoming streams are forecast to produce near 125 to 145 percent of normal.

Tributaries to the South Platte in Colorado are expected to flow at near 10 to 15 percent greater than normal.

Carryover reservoir storage is 85 percent average in Montana, 102 percent average on Wyoming's Wind River, 200 percent on the

North Platte and 134 percent in Colorado on the South Platte.

ARKANSAS BASIN

The Arkansas River snowpack is about 15 to 20 percent above normal for this time of year. Assuming average snowfall and spring rains during the remainder of the season, the Arkansas River at Salida is expected to yield about 5 percent above normal flow. Outlook for the Purgatoire and Cucharas rivers is for streamflow to be 10 to 20 percent above usual amounts. Flow of Canadian River should be near normal.

Storage in John Martin Reservoir on the Arkansas River is not favorable, with only 22 percent of average. In New Mexico on the Canadian River, storage in Conchas Reservoir is 48 percent of average.

Mountain soil moisture is near an average condition.

Since about 60 percent of the snow season is over in New Mexico, considerable more snow is needed to assure adequate water supplies next summer.

RIO GRANDE BASIN

The snowpack is average or better on all watersheds of the Rio Grande Basin this year. It ranges from essentially average on the Pecos and Chama rivers to 25 percent above average on the upper Rio Grande in Colorado.

Mountain soil moisture conditions are near normal in both Colorado and New Mexico. Valley soil moisture is also reported to be in fair to good condition.

Flow of the Rio Grande near Del Norte, Colorado is expected to be about 10 percent more than usual. Inflow to the river system is expected to be near average from the Chama River and 15 percent above average from the Conejos River. Surface runoff water supplies on the Pecos River are expected to be comparable, with a forecast of 110 percent of average.

Carryover storage reflects last year's poor water supply. Storage in Elephant Butte Reservoir is 60 percent average, and is also less than normal on the Pecos River.

COLORADO BASIN

The present snow cover in the Upper Colorado River basin is quite favorable. It varies from a low of 113 percent average in the Yampa-White rivers area of Colorado to a high of 172 percent on Utah's Duchesne River. The snow is near 20 percent above average on the upper Colorado and Gunnison rivers in Colorado, 128 percent on the San Juan and 159

SELECTED STREAMFLOW FORECASTS

FEBRUARY 1, 1972

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
SASKATCHEWAN				
St. Mary near Babb, Montana <u>1</u> /				
UPPER MISSOURI				
Beaverhead near Grant, Montana <u>2</u> /				
Big Hole near Melrose, Montana				
Jefferson at Sappington, Montana				
Madison near Grayling, Montana <u>3</u> /				
Gallatin near Gateway, Montana				
Sun at Gibson Dam, Montana <u>4</u> /				
Belt near Monarch, Montana				
Marias near Shelby, Montana <u>5</u> /				
Missouri near Landusky, Montana <u>6</u> /				
near Williston, North Dakota <u>7</u> /				
S. Fk. Musselshell above Martinsdale, Montana				
Milk at Eastern Crossing, Montana				
Yellowstone at Yellowstone Lake Outlet, Wyo.	970	116	April-Oct.	1,217
at Corwin Springs, Montana				
at Miles City, Montana <u>8</u> /				
Clarks Fork near Belfry, Montana				
Shoshone below Buffalo Bill Res., Wyo. <u>9</u> /	1,000	123	April-Sept.	786
Wind near Dubois, Wyoming	131	132	April-Sept.	144
at Riverton, Wyoming <u>10</u> /	870	134	April-Sept.	668
below Boysen Res., Wyoming <u>11</u> /	1,030	136	April-Sept.	
Bull Lake Creek above Bull Lake, Wyoming	240	135	April-Sept.	206
Little Popo Agie near Lander, Wyoming	66	155	April-Sept.	73
Tensleep near Tensleep, Wyoming	89	120	April-Sept.	88
Medicine Lodge near Hyattville, Wyoming	24.6	124	April-Sept.	21.0
Shell Creek near Shell, Wyoming	82	124	April-Sept.	26.6
Big Horn near St. Xavier <u>8</u> /				
Tongue near Dayton, Wyoming	129	125	April-Sept.	112
No. Fork Powder near Hazelton, Wyoming	11.1	123	April-Sept.	10.8
PLATTE				
North Platte at Saratoga, Wyoming	800	144	April-Sept.	
Encampment near Encampment, Wyoming	176	139	April-Sept.	221
Laramie near Jelm, Wyoming <u>12</u> /	152	146	April-Sept.	140
Big Thompson at Drake, Colorado <u>13</u> /	114	114	April-Sept.	
Clear at Golden, Colorado <u>14</u> /	130	109	April-Sept.	
St. Vrain at Lyons, Colorado <u>15</u> /	80	114	April-Sept.	
Cache La Poudre near Fort Collins, Colorado <u>16</u> /	235	108	April-Sept.	
ARKANSAS				
Arkansas at Salida, Colorado <u>17</u> /	325	105	April-Sept.	
Cucharas near LaVeta, Colorado	14	117	April-Sept.	
Purgatoire at Trinidad, Colorado	50	110	April-Sept.	
RIO GRANDE				
Rio Grande near Del Norte, Colorado <u>18</u> /	480	110	April-Sept.	
at Otowi Bridge, New Mexico <u>19</u> /	530	103	March-July	
Conejos near Mogote, Colorado <u>20</u> /	210	115	April-Sept.	
El Vado Res., Inflow, New Mexico	190	100	March-July	
Pecos at Pecos, New Mexico	45	110	March-July	
UPPER COLORADO				
Colorado, Grandby Res. Inflow, Colorado <u>21</u> /	225	103	April-Sept.	
near Dotsero, Colorado <u>22</u> /	1,500	109	April-Sept.	
near Cameo, Colorado <u>23</u> /	2,440	110	April-Sept.	
near Cisco, Utah <u>24</u> /	3,365	120	April-July	
Lake Powell Inflow, Arizona <u>25</u> /	8,628	132	April-July	8,378
Roaring Fork at Glenwood Springs, Colorado <u>26</u> /	800	115	April-Sept.	
Umcompagre at Colona, Colorado	145	112	April-Sept.	

Forecasts in California provided by Department of Water Resources.
Average is for 1953-67 period except California. California is computed for 1916-65 period.
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.

Explanatory Notes on Forecasts listed on Inside Back Cover.

SELECTED STREAMFLOW FORECASTS

FEBRUARY 1, 1972

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
UPPER COLORADO (continued)				
Gunnison, Blue Mesa Res. Inflow, Colorado <u>27/</u> near Grand Junction, Colorado <u>28/</u>	875 1,310	114 115	April-Sept. April-Sept.	
Dolores at Dolores, Colorado	275	119	April-Sept.	
Green at Warren Bridge, Wyoming	435	135	April-Sept.	452
at Green River, Wyoming <u>29/</u>	1,400	149	April-Sept.	1,360
Flaming Gorge Res. Inflow, Utah <u>27/</u> at Green River, Utah <u>30/</u>	1,762 3,552	167 138	April-July April-July	1,905
North Piney at Mason, Wyoming	49	142	April-Sept.	67
Big Sandy near Big Sandy, Wyoming	86	162	April-Sept.	69
Yampa at Steamboat Springs, Colorado near Maybell, Colorado	300 950	115 111	April-Sept. April-Sept.	
Little Snake near Dixon, Wyoming	360	139	April-Sept.	486
White near Meeker, Colorado	330	113	April-Sept.	
Strawberry at Duchesne, Utah <u>40/</u>	80	160	April-July	62
Duchesne near Tabiona, Utah <u>31/</u> at Randlett, Utah <u>40/</u>	129 343	137 131	April-July April-July	
Lakefork below Moon Lake, Utah <u>32/</u>	77	117	April-July	
Uinta near Neola, Utah	100	127	April-July	
Whiterocks near Whiterocks, Utah	65	127	April-July	59
Price, Scofield Res. Inflow, Utah <u>33/</u>	45	141	April-July	34
Cottonwood near Orangeville, Utah <u>34/</u>	55	125	April-July	49
San Juan, Navajo Res. Inflow, New Mexico <u>27/</u> near Bluff, Utah <u>35/</u>	725 1,189	117 134	April-July April-July	305
Animas at Durango, Colorado	500	122	April-Sept.	
LOWER COLORADO				
Virgin near Virgin, Utah	45	118	April-June	
Little Colorado above Lyman, Arizona	7	78	Jan.-June	1.4
Gila near Solomon, Arizona	108	90	Jan.-May	26.2
Frisco at Clifton, Arizona	53	89	Jan.-May	13.4
Salt at Intake, Arizona	189	67	Jan.-May	68.9
Tonto above Roosevelt, Arizona	13	30	Jan.-May	6.1
Verde above Horseshoe Dam, Arizona	98	57	Jan.-May	68.3
GREAT BASIN				
Bear at Utah-Wyo. State Line at Harer, Idaho	149 400	141 177	April-July April-Sept.	138
Smith's Fork near Border, Wyoming	142	131	April-Sept.	198
Thomas Fork near Wyo.-Ida. State Line	44	140	April-Sept.	70
Logan near Logan, Utah <u>36/</u>	155	157	April-July	203
Ogden, Pine View Res. Inflow, Utah <u>27/</u>	170	189	April-June	160
Weber near Oakley, Utah	122	131	April-June	124
Provo near Hailstone, Utah <u>37/</u>	144	166	April-July	
Strawberry Res. Inflow, Utah	70	171	April-July	
Utah Lake Net Inflow, Utah	350	179	April-July	241
Big Cottonwood near Salt Lake City, Utah	46	135	April-July	42
Beaver near Beaver, Utah	23	122	April-July	19.4
Sevier near Hatch, Utah near Gunnison, Utah	45 47	136 152	April-July April-July	
So. Fork Humboldt near Elko, Nevada				
Humboldt at Palisades, Nevada	236	153	April-July	462
Truckee at Farad, California <u>38/</u>				
East Carson near Gardnerville, Nevada				
West Carson at Woodsfords, California				
East Walker near Bridgeport, California <u>39/</u>				
West Walker near Coleville, California	165	115	April-July	150
Donner und Blitzen near Frenchglen, Oregon	74	129	March-July	
Silvies near Burns, Oregon	152	150	March-July	
Chewaucan near Paisley, Oregon	99	112	March-July	
Deep above Adel, Oregon	91	124	March-July	
Bidwell near Ft. Bidwell, California				

Forecasts in California provided by Department of Water Resources.
Average is for 1953-67 period except California. California is computed for 1916-65 period.
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.

Explanatory Notes on Forecasts listed on Inside Back Cover.

FEBRUARY 1, 1972

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
UPPER COLUMBIA				
Columbia at Revelstoke, British Columbia				
at Birchbank, British Columbia <u>40/</u>	51,930	112	April-Sept.	48,592
at Grand Coulee, Washington <u>40/</u>	82,450	119	April-Sept.	75,360
Kootenai at Libby, Montana	9,900	123	April-Sept.	8,966
at Leonia, Idaho	11,400	124	April-Sept.	10,484
Blackfoot near Bonner, Montana	1,300	129	April-Sept.	1,283
So. Fk. Flathead nr Columbia Falls, Montana <u>40/</u>	2,950	125	April-Sept.	2,816
Flathead at Columbia Falls, Montana <u>40/</u>	8,000	124	April-Sept.	7,498
near Polson, Montana <u>40/</u>	9,600	124	April-Sept.	9,382
Clark Fork above Missoula, Montana	2,300	130	April-Sept.	1,980
near Plains, Montana <u>40/</u>	16,200	130	April-Sept.	15,439
at Whitehorse Rapids, Idaho	18,000	130	April-Sept.	
Bitterroot near Darby, Montana	700	125	April-Sept.	780
Priest near Priest River, Idaho <u>41/</u>				
Pend Oreille below Box Canyon, Washington				
Kettle near Laurier, Washington				
Spokane at Post Falls, Idaho <u>42/</u>	3,950	126	April-Sept.	
Similkameen near Nighthawk, Washington				
Okanogan near Tonasket, Washington				
Methow near Pateros, Washington				
Stehekin at Stehekin, Washington				
Chelan at Chelan, Washington <u>43/</u>				
Wenatchee at Peshastin, Washington				
SNAKE				
SNAKE above Palisades Res., Wyoming <u>44/</u>	3,400	133	April-Sept.	4,061
near Heise, Idaho <u>45/</u>	5,240	140	April-Sept.	
near Blackfoot, Idaho <u>46/</u>				
at Weiser, Idaho				
Grey's above Palisade, Wyoming	456	126	April-Sept.	634
Salt above Palisade, Wyoming	400	125	April-Sept.	700
Henry's Fork near Ashton, Idaho <u>47/</u>				
Teton near St. Anthony, Idaho				
Blackfoot Reservoir Inflow, Idaho				
Big Lost near Mackay, Idaho <u>48/</u>	235	140	April-Sept.	
Portneuf at Topaz, Idaho				
Salmon Falls Creek nr San Jacinto, Idaho				
Big Wood, Inflow to Magic Res., Idaho <u>49/</u>	400	150	April-Sept.	
Bruneau near Hot Springs, Idaho				
Boise near Boise, Idaho <u>50/</u>	2,330	150	April-Sept.	
Jordan near Jordan Valley, Oregon	141	168	April-July	
Owyhee near Owyhee, Nevada <u>51/</u>	131	218	April-July	124
Owyhee Res. Net Inflow, Oregon <u>27/</u>	900	194	Feb.-July	805
Malheur near Drewsey, Oregon	178	160	Feb.-July	
Payette near Horseshoe Bend, Idaho <u>52/</u>	2,480	135	April-Sept.	
Weiser above Crane Creek, Idaho <u>40/</u>				
Burnt near Hereford, Oregon <u>40/</u>	73	152	Feb.-July	
Powder near Center, Oregon	78	144	April-July	
Eagle above Skull Creek, Oregon				
Imnaha at Imnaha, Idaho	341	111	April-Sept.	
Salmon at Whitebird, Idaho	9,040	132	April-Sept.	
Lostine near Lostine, Oregon	138	110	April-Sept.	
Grand Ronde at LaGrande, Oregon	295	140	March-Sept.	223
Clearwater at Spalding, Idaho	11,490	134	April-Sept.	
LOWER COLUMBIA				
Yakima at CleElum, Washington <u>53/</u>				
near Parker, Washington <u>54/</u>				
Naches near Naches, Washington <u>55/</u>				
Walla Walla, So. Fk. near Milton, Oregon	87	111	March-Sept.	

Forecasts in California provided by Department of Water Resources.
Average is for 1953-67 period except California. California is computed for 1916-65 period.
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.

Explanatory Notes and Forecasts listed on Inside Back Cover.

SELECTED STREAMFLOW FORECASTS

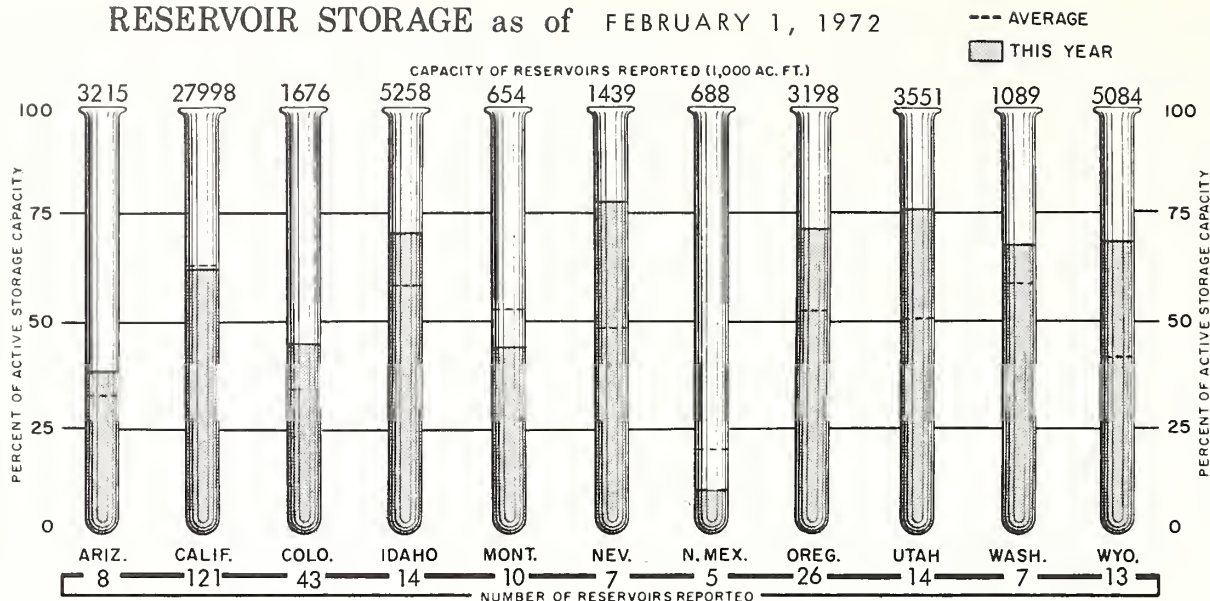
FEBRUARY 1, 1972

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
LOWER COLUMBIA (continued)				
Umatilla at Pendleton, Oregon	259	124	March-Sept.	191
John Day, Middle Fork at Ritter, Oregon	170	126	March-July	
North Fork at Monument, Oregon	935	137	March-July	
Crooked near Post, Oregon	234	136	Feb.-July	
Deschutes at Benham Falls, Oregon 40/	465	118	April-July	
Columbia at The Dalles, Oregon 40/	128,040	122	April-Sept.	123,427
Hood near Tucker Bridge, Oregon 40/	380	135	April-July	
McKenzie near Vida, Oregon	1,517	140	April-July	
Santiam, South, at Waterloo, Oregon	728	122	April-July	
North, at Mehama, Oregon 40/	1,002	125	April-July	
Clackamas at Estacada, Oregon	845	123	April-July	
Willamette at Salem, Oregon 40/	5,858	125	April-July	
Lewis at Ariel, Washington 56/				
Cowlitz at Castle Rock, Washington 57/				
NORTH PACIFIC COASTAL				
Dungeness near Sequim, Washington				
Umpqua, No., near Tokatee Falls, Oregon 40/	196	111	April-Sept.	
Rogue at Raygold, Oregon	1,061	113	April-Sept.	1,303
Klamath Lake, Net Inflow, Oregon	1,003	102	Feb.-Sept.	1,243
Trinity at Lewiston, California	680	110	April-July	734
CALIFORNIA CENTRAL VALLEY 40/				
Sacramento, Inflow to Shasta, California	1,720	97	April-July	
Feather near Oroville, California	1,520	82	April-July	2,701
Yuba at Smartville, California	950	88	April-July	1,387
American, Inflow to Folsom Res., Calif.	1,260	96	April-July	1,445
Cosumnes at Michigan Bar, California	150	103	April-July	123
Mokelumne, Inflow to Pardee Res., Calif.	470	101	April-July	490
Stanislaus, Inflow to Melones Res., Calif.	700	98	April-July	664
Tuolumne, Inflow to Don Pedro Res., Calif.	1,200	101	April-July	1,058
Merced, Inflow to Exchequer Res., Calif.	560	92	April-July	502
San Joaquin, Inflow to Millerton Lake, Calif.	1,140	95	April-July	970
Kings, Inflow to Pine Flat Res., California	1,090	94	April-July	820
Kaweah, Inflow to Terminus Res., California	230	85	April-July	196
Tule, Inflow to Success Res., California	30	51	April-July	37
Kern, Inflow to Isabella Res., California	250	60	April-July	230
ALASKA				
Chena at Fairbanks, Alaska				
Salcha near Salchaket, Alaska				

Forecasts in California provided by Department of Water Resources.
Average is for 1953-67 period except California. California is computed for 1916-65 period.
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.

Explanatory Notes on Forecasts listed on Inside Back Cover.

RESERVOIR STORAGE as of FEBRUARY 1, 1972



percent on the upper Green River in Wyoming.

Soil moisture conditions are near average or above in most areas. This, combined with the favorable snowpack conditions, provide a good to excellent water supply outlook for the coming summer. Prospective runoff is lowest on the upper Colorado, Gunnison, Yampa and White rivers. Average to 15 percent above average streamflow is expected from these rivers.

The heavy snows on the upper Green River indicate an inflow to Flaming Gorge Reservoir of 167 percent average. After contributions from the Yampa, White and Duchesne rivers, flow of the Green at Green River, Utah is expected to be 138 percent average. The San Juan near Bluff, Utah has a similar forecast, at 134 percent average. The Colorado near Cisco, Utah is forecast at 120 percent. April-July inflow to Lake Powell should be near 132 percent. Storage in irrigation reservoirs is well above average.

In the lower Colorado Basin the Virgin River should yield near 15 to 20 percent above average flows. In Arizona near normal water supplies are predicted for this year. Spring runoff is expected to be below average, but two to five times that of last year. Reservoir storage is near normal or above and should largely offset any deficit in streamflow.

Snow cover varies from 33 percent of the usual amount on the Verde watershed to 87 percent on the Little Colorado, with 67 percent on the Salt and 75 percent on the Gila.

Salt River Project streams are predicted to

produce 300,000 acre-feet during the January-May period. This is twice that received last year, but only 61 percent of average. The Gila River is forecast at 90 percent average.

GREAT BASIN

All areas of the Great Basin have snowpacks which are average or well above. This, combined with reservoir storage which is also well above average, promises good to excellent water supplies next summer for all areas.

With the exception of the Bear River and Tahoe-Truckee basins, this year's snowpack equals or exceeds the heavy snows of last year. While the Tahoe-Truckee snow is only three-fourths of that of a year ago, it is still 22 percent above average. On the Bear River as a whole, snow is about 10 percent less than a year ago, but still ranges from about 150 to 200 percent average.

In other areas of Utah snow cover ranges from about 150 percent average on the Sevier, Provo River and Utah Lake drainages to 180 percent on the Ogden River. Many snow courses already have as much water content as is usually measured on April 1st.

In Nevada the snow ranges from the 22 percent above average on the Tahoe-Truckee to over 150 percent average on parts of the Humboldt River. In Oregon it is 125 percent in Lake County and 175 percent in the Harney Basin.

Forecast flows for Oregon streams range from 112 percent on the Chewaucan near Paisley to 150 percent on the Silvies River near Burns. In Nevada, water users along the Humboldt

STORAGE IN LARGE RESERVOIRS

FEBRUARY 1, 1972

BASIN AND NAME OF RESERVOIR	CAPACITY (1,000 A.F.)	STORAGE (1,000 A.F.)	STORAGE PERCENT AVERAGE	BASIN AND NAME OF RESERVOIR	CAPACITY (1,000 A.F.)	STORAGE (1,000 A.F.)	STORAGE PERCENT AVERAGE
UPPER MISSOURI				UPPER COLUMBIA			
Belle Fourche	185	126	175	Chelan	676	190	60
Boysen	550	380	93	Coeur d'Alene	225	147	119
Buffalo Bill	373	224	147	Duncan	1,347	502	---
Canyon Ferry	2,043	1,662	104	Flathead	1,791	1,099	93
Fort Peck	19,410	16,410	150	Hungry Horse	3,428	1,870	76
Garrison	24,790	19,573	179	Kootenay	673	608	97
Hebgen	377	259	153	Lower Arrow	3,083	357	88
Keyhole	192	148	453	Noxon Rapids	335	308	96
Lake Francis Case	5,816	3,305	108	Pend Oreille	1,155	167	33
Lake Sharp	1,900	1,763	106	Roosevelt	5,232	4,420	116
Oahe	23,630	17,657	162	Upper Arrow	4,061	288	33
Tiber	1,347	449	71				
Big Horn	1,356	874	121	LOWER COLUMBIA			
PLATTE				Cougar	155	48	---
				Detroit	300	70	167
City of Denver (5)	507	435	112	Green Peter	270	83	---
Colo-Big Thompson (3)	718	544	129	Hills Creek	200	83	377
Glendo	784	390	144	Lookout Point	337	104	221
Pathfinder	1,016	894	260	Prineville	153	92	100
Seminole	1,010	686	192	Wickiup	200	191	119
ARKANSAS				Yakima Res. (5)	1,066	723	108
				SNAKE			
Conchas	273	79	48	American Falls	1,700	1,283	103
John Martin	354	18	22	Anderson Ranch	423	293	129
RIO GRANDE				Arrowrock	287	276	121
				Brownlee	980	840	---
Elephant Butte	2,195	225	60	Cascade	653	335	121
El Vado	195	1	25	Jackson	847	631	143
UPPER COLORADO				Lucky Peak	278	122	112
				Owyhee	715	596	166
Blue Mesa	830	372	---	Palisades	1,200	913	136
Flaming Gorge	3,749	2,632	---	Warm Springs	191	122	163
Navajo	1,696	929	---	PACIFIC COASTAL			
Powell	25,002	12,943	---	Clair Engle	2,448	2,017	104
Starvation	152	135	---	Clear Lake	440	302	146
LOWER COLORADO				Nacimiento	350	71	41
				Ross	1,203	822	86
Havasu	619	539	100	Upper Klamath	584	406	112
Mead	26,159	17,901	108	CALIFORNIA CENTRAL VALLEY			
Mohave	1,810	1,631	97	Almanor	1,036	645	97
Salt River Res. (4)	1,755	933	100	Berryessa	1,602	1,376	90
San Carlos	985	134	136	Folsom	1,010	598	106
Verde River Res. (2)	318	126	126	Isabella	570	122	72
GREAT BASIN				McClure	1,026	560	105
				Millerton	521	315	85
Bear	1,421	1,105	129	New Bullards Bar	930	358	65
Lahontan	314	254	147	Oroville	3,484	2,719	123
Rye Patch	179	173	258	Pine Flat	1,013	454	79
Sevier Bridge	236	157	237	Shasta	4,500	3,404	104
Strawberry	274	196	167				
Tahoe	732	522	131				
Utah	884	807	155				
Willard Bay	193	173	---				

Reservoir Storage Data Provided by Bureau of Reclamation, Corps of Engineers, Geological Survey, and water using organizations. Data from California and British Columbia provided by Department of Water Resources and Department of Lands, Forests and Water Resources, respectively.

River can expect to realize near 50 percent above average supplies. Rye Patch Reservoir has storage which is 258 percent of average and 97 percent of capacity.

In addition to above average runoff expected from Tahoe-Truckee, Walker and Carson drainages, storage in Lake Tahoe is 131 percent average, while Bridgeport, Lahontan and Topaz reservoirs hold, respectively, 35, 47 and 16 percent above average amounts.

Snow cover in eastern and central Nevada is near or above normal for this date.

In Utah stream forecasts range from a low of 122 percent on the Beaver River in the south, to 224 percent on Lost Creek, a tributary to the Weber River. Forecasts for most streams range between about 135 to 190 percent of average, and have a potential for high peak flows again this year.

Reservoir storage in Utah is excellent, generally ranging near 150 percent of average.

COLUMBIA BASIN

A good to excellent water supply is anticipated for next summer throughout the Columbia Basin. Near 10 to 35 percent above normal streamflow is expected in much of British Columbia, Washington, Idaho's Panhandle and northwest Montana. Forecasts for most central Idaho streams range from about 130 to 150 percent normal, with flows from southern tributaries to the Snake expected to be as much as twice normal. Most Oregon streams should yield near 120 to 160 percent. Inflow to Owyhee Reservoir should be near twice the normal amount.

Snow accumulation to February 1 has been generally well above average in all areas of the Columbia Basin and Pacific Northwest. With the exception of a small section which includes the Colville and Priest rivers of Washington and Idaho near the Canadian border (where the snow is about 5 to 20 percent above average), the entire area has a snowpack which ranges from about 25 percent above average to over two and one-half times the usual pack.

Many snow courses have water equivalents which approach or exceed previous February 1st maximum readings. On most watersheds of the U. S. portion of the Basin the snow is already at or above the average April 1st snowpack.

Snow at the higher elevations is similar to last year's pack on this date, but the lower elevation snows are much heavier. On Canadian watersheds the snow is generally 20 to 35 percent higher than last year. Although some lower elevation watersheds in western Washington, Oregon and southern Idaho lost snowpack during the warm period in January, there is still a potential for high, fast runoff

from many of these watersheds.

Soil moisture is near normal or above except in Montana and Canada where it tends to be drier than usual.

Storage in irrigation reservoirs is well above average. Because of the heavy snowpack many of these are expected to be drawn down early to provide room for expected high water.

ALASKA

Extremely heavy snowfall during the early part of the winter has resulted in a far greater than normal snowpack on a number of Alaskan watersheds. In the Susitna Basin snow depths exceed all previous records regardless of date. Snow water content exceeds previous February 1st maximum readings and approaches previous records. A similar situation exists in the Copper Basin.

Near Fairbanks on the Chena and Salcha rivers the snow is a little below last year's record and could develop into a serious flood potential again this year.

On Ship Creek near Anchorage readings show the snow to be about a third above average. Bad flying weather delayed reports for other areas of the state.

CALIFORNIA

The California Department of Water Resources, coordinating agency for snow surveys and water supply forecasting in California, reports that the predominance of light precipitation and below normal temperatures during this water year have resulted in below normal streamflow and a near normal snowpack. February 1 forecasts for the State's major streams indicate that with normal precipitation through the forecast period, runoff will range from 110 percent to 50 percent of normal during the April-July period. Carryover storage in the State's major reservoirs is normal or above in all major hydrographic areas except for the San Francisco Bay, Central Coastal, and the San Joaquin Valley. Here, water in storage is 90 percent of normal or more for this date. Although on February 1 some 50 percent of the State's normal precipitation is yet to come, the present combination of water supply factors indicate that present water supply prospects should be adequate to meet most demands.

Seasonal precipitation over California for the period October 1, 1971 through January 31, 1972 averaged 80 percent of normal. Generally, the amounts of precipitation through the four month series were light, moderate, heavy, and light again. The new 1971-72 water year began with a subnormal October, recording only a single storm period during midmonth. Heaviest amounts, up to four inches, were

Forecasts of runoff for the April-July period, based on subsequent normal precipitation, show Central Valley streams at about 90 percent of their 50-year average. Water year forecasts of unimpaired runoff for the State's streams is 85 percent of average. Only South Coastal area streams are now forecasted for normal runoff this water year.

Runoff for the October-January period for California streams was 80 percent of normal. Only in the South Coastal areas was runoff near normal. The cold regime and below normal precipitation limited the season-to-date runoff from Sacramento and San Joaquin Valley tributaries to about 70 percent of their 50-year average for this period. During January, runoff from Central Valley streams was 60 percent of average for the month.

February 1 storage in 121 California reservoirs, with a combined capacity of 29,800,000 acre-feet, was 17,500,000 acre-feet. This represents normal storage for this date and a net decrease of about 1,446,000 acre-feet from that reported one year ago. reported from the upper watershed in the San Diego area. Otherwise, it was very light over the rest of the State. November storm distributions were of the typical California type; heavy over the northern half, and light over the southern half. Two storm periods around the 12th and 28th, moderate in amounts, primed the North Coastal area with rain and laid the seasonal snow base in the central Sierra. December was wet all over, especially in Southern California where flood damages occurred when over 300 percent of normal pre-

cipitation amounts fell through three prolonged storm periods. Squirrel Inn, in the San Gabriel Mountains, reported a December total of 20.78 inches or 300 percent of normal. At the higher elevations, deep snow accumulations were experienced during the final week. Norden, in the Yuba River drainage, received 83 inches in five consecutive days. A very lengthy dry spell ushered in the new year as the first 20 days in January were virtually without precipitation. Persistent dominance by high barometric pressure over the State finally shifted during the last third of the month. Two light and extremely cold storms swept through with an unusual freezing level, below 100 feet, resulting in snow on the Sacramento Valley floor. As the storms tracked through north of the Tehachapi Mountains, Southern California experienced their driest January of record since 1877 with zero precipitation.

February 1 measurements from some 200 snow courses, 95 aerial snow depth markers, and 34 reporting snow sensors indicate that the snowpack for Cascade and Sierra watersheds was 115 percent of normal for this date or 75 percent of the April 1 average. The predominant cold temperatures have allowed an unusually high amount of this pack to be retained at relatively low elevations. Snow survey measurements and observations of aerial snow depth markers indicate the average depth of the snowpack above the 6,000-foot level is about five feet. Snow densities are about 30 percent with the top one-third of the pack very light due to the continuing cold conditions.



EXPLANATION of STREAMFLOW FORECASTS

All flows are observed flows except as adjusted for: 1/ Storage change in Lake Sherburne. 2/ Storage change in Lima and Clark Canyon reservoirs. 3/ Storage change in Hebgen Lake. 4/ Storage change in Gibson Reservoir and measured diversions. 5/ Storage change in Two Medicine, Four Horns, Lake Francis and Swift reservoirs. 6/ Storage change in Canyon Ferry and Tiber reservoirs. 7/ Changes as indicated in (6/), (8/), plus storage change in Fort Peck. 8/ Storage change in Boysen, Buffalo Bill and Yellowtail reservoirs. 9/ Storage change in Buffalo Bill Reservoir plus Heart Mountain diversion. 10/ Storage change in Pilot Butte and Bull Lake reservoirs plus Wyoming canal diversion.

11/ Changes indicated in (10/) plus storage change in Boysen Reservoir. 12/ Plus diversions to Cache LaPoudre. 13/ Plus by-pass to power plants. 14/ Minus diversion thru Gumlick Tunnel. 15/ Storage change in Price Reservoir. 16/ Minus diversions from North Platte, Laramie and Colorado rivers plus measured diversions above station. 17/ Storage change in Clear Creek, Twin Lakes and Turquoise reservoirs minus diversions from Colorado River. 18/ Storage change in Rio Grande, Santa Maria and Continental reservoirs. 19/ Storage change in El Vado and Abiquiu reservoirs. 20/ Storage change in Platoro Reservoir.

21/ Storage change in Grandby Reservoir as furnished by U.S.B.R. plus diversions by Adams Tunnel and Grand River Ditch. 22/ Changes as indicated in (21/) plus diversions thru Roberts, Gumlick and Moffat tunnels and storage change in Dillon, Homestake, Williams Fork, Green Mountain and Willow Creek reservoirs. 23/ Changes indicated in (22/) and (26/). 24/ Storage change in Blue Mesa Reservoir. 25/ Changes indicated in (24/), (30/) and (35/) and storage change in Lake Powell. 26/ Diversions to Arkansas River plus storage change in Ruedi Reservoir. 27/ (Inflow record as computed by U. S. Bureau of Reclamation.) 28/ Storage change in Taylor, Blue Mesa and Morrow Point reservoirs. 29/ Storage change in Fontenelle Reservoir. 30/ Storage change in Flaming Gorge Reservoir.

31/ Plus diversion through Duchesne Tunnel. 32/ Storage change in Moon Lake Reservoir. 33/ Storage change in Scofield Reservoir. 34/ Storage change in Joe's Valley Reservoir. 35/ Storage change in Navajo Reservoir. 36/ Plus U. P. & L. Co. tailrace and Logan, Hyde Park and Smithfield canals. 37/ Minus diversions thru Duchesne Tunnel and Weber-Provo Canal. 38/ Storage change in Lake Tahoe and Boca reservoirs (Forecast by Truckee Basin Committee.) 39/ Storage change in Bridgeport Reservoir. 40/ Corrected for major upstream impairments -- represents simulated natural flow conditions.

41/ Storage change in Priest Lake. 42/ Storage change in Coeur d'Alene Lake and diversions by Spokane Valley Farms Co. and Rathrum Prairie canals. 43/ Storage change in Lake Chelan. 44/ Storage change in Jackson Lake. 45/ Storage change in Jackson Lake and Palisade reservoirs. 46/ Storage change in Jackson Lake, Palisades, Island Park, Henry's Lake, Grassy Lake plus diversions between Heise and Blackfoot. 47/ Storage change in Henry's Lake and Island Park reservoirs. 48/ Storage change in MacKay Reservoir and diversion in Sharp Ditch. 49/ Combined flow Big Wood near Bellevue and Camas Creek near Blaine. 50/ Storage change in Arrowrock, Anderson Ranch and Lucky Peak reservoirs.

51/ Storage change in Wild Horse Reservoir. 52/ Storage change in Cascade and Deadwood reservoirs. 53/ Storage change in Keechelus, Kachess and CleElum reservoirs plus diversion by Kittitas Canal. 54/ Changes indicated in (52/) plus storage change in Bumping and Rimrock Lakes plus diversion by Roza, Union Gap, New Reservation, Old Reservation and Sunrise canals. 55/ Storage change in Bumping and Rimrock lakes and diversions by Tieton, Selah Valley, Wapatox canals and City of Yakima. 56/ Storage change in Merwin, Yale and Swift reservoirs. 57/ Storage change in Mayfield Reservoir.

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